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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,015	11/26/2003	Alexei A. Erchak	16459-011001	7556

26161 7590 09/21/2005

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EXAMINER

HODGES, MATTHEW P

ART UNIT PAPER NUMBER

2879

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/724,015

Applicant(s)

ERCHAK, ALEXEI A.

Examiner

Matt P. Hodges

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 27-56 and 60 is/are pending in the application.
- 4a) Of the above claim(s) 1-26, 57-59, 61 and 62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-56 and 60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/31/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of election of species requirement in the reply filed on 5/23/2005 is acknowledged.

### *Drawings*

The drawings were received on 2/16/2005. These drawings are accepted.

### *Specification*

The disclosure is objected to because of the following informalities:

Page 6, lines 8, 17, and 26, the word "tow" appears to be a typographical error for the word "two".

Page 6, lines 11, 20, and 29, the phrase "of the length of the edge" is included twice and appears to be redundant.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

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The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

Appropriate correction is required.

### ***Claim Objections***

Claim 1 is objected to because of the following informalities:

Claim 1 line 8, the phrase "of the length of the edge" is included twice and appears to be redundant. It is assumed for the purposes of examination that the second phrase should be deleted.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 27-44, 46, 48-54, and 60 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: The structural components that enable the extraction efficiency to be independent of the length of the edge of the device.

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Claim 41 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically it is unclear to the examiner how the p-ohmic contact is located between the p-doped layer and the reflective layer. This is neither described in the specification or provided for in the drawings. It is unclear how a contact layer in that position could serve the function of a p-ohmic contact.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claimss 27 and 55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10724029 in view of Krames. The claims are identical except for the inclusion of the side dimension of 1mm and for the recitation of the extraction efficiency being independent of the edge length. However extraction efficiency is a product of wave guide modes, and as such is dependent on the structure of the emitting face. In this case, the pattern of holes would eliminate

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edge to extraction efficiency dependencies. (See Krames in the rejection of claim 27 below for further details) Further Krames establishes the common use of light emitting devices with edges of 1mm.

This is a provisional obviousness-type double patenting rejection. However as this case has been allowed, the provisional rejection will not be lifted even if all other issues have been resolved.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 27, 32, 35-40, 43-54, 56, and 60 are rejected under 35 U.S.C. 102(e) as being anticipated by Krames et al. (US 2003/0141507).

Regarding claim 27, 32, Krames discloses (see figure 7F) a light emitting device including a light generating region (112), a first layer (116) formed over the light generating region, and a pattern of holes (122-I) formed in the first layer and varying the dielectric constant of the device. (Page 3 paragraphs 0036-0038). The device is at least 1mm<sup>2</sup>. (Page 9 paragraphs 0120). The extraction efficiency is limited by waveguide losses of the emitted light. To improve efficiency the holes, formed in a two-dimensional lattice, substantially remove the wave guide

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mode losses leaving the device extraction efficiency independent of the surface area of the device. (Page 1 paragraphs 0004, 0007, 0008, 0009, 0018, and 0044).

Regarding claims 35-38, 43, 44, 48, 49, Krames further discloses (see figure 7F) the device including the following layers in order: support substrate (142), first electrode layer (121), n-doped layer (108), light emitting layer (112), p-doped layer (116), and second electrode (120). Further electrode and doped layers are electrically connected by means of contacts (120 for n-doped – p-doped not shown). The active layers are composed of doped GaN for instance. The layers of p and n-doped materials can be inverted. (Page 5 paragraph 0058)

Regarding claim 39, the first electrode is made of a highly reflective layer of Al or Ag. This layer has a reflectivity greater than 50%.

Regarding claim 40, the p-doped material is formed between the reflective electrode and the n-doped layer. (See rejection of claim 36 above).

Regarding claims 45-47, Krames further discloses the alternative use of a pattern of holes that extend just into the first layer or into both the first layer and light emitting layer. (Page 3 paragraphs 0038).

Regarding claims 50-54, Krames discloses the use of the light emitting device as a flat type light emitting diode. Further the diode is packaged (see figure 13) to form a packaged die or packaged light emitting device.

Regarding claim 56, Krames discloses the pattern to be a complex pattern such as a honeycomb pattern. (Page 4 paragraph 0042).

Regarding claim 60, Krames discloses the use of features with a size less than  $\lambda/5$ . (Paragraphs 0047).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joannopoulos et al. (US 5,955,749).

Regarding claim 27, Joannopoulos discloses (see figure 5) a light emitting device including a light generating region (506), a first layer (508) formed over the light generating region, and a pattern of holes (510) formed in the first layer and varying the dielectric constant of the device. (Column 7 lines 46-67). The extraction efficiency is limited by waveguide losses of the emitted light. To improve efficiency the holes, formed in a two-dimensional lattice, substantially remove the wave guide mode losses leaving the device extraction efficiency independent of the surface area of the device. (Column 6 lines 19-30). Joannopoulos does not appear to specify the size of one edge of the device being at least 1mm. However it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. Here, increasing the surface area of the device advantageously increases the luminosity of the device. The upper bound of the size increase however is bounded by the limitations of manufacturing. Larger surface areas incur a greater manufacturing cost due to errors in production. Thus it would have been obvious to use a device with a 1mm side as selecting the length of the sides of the device is just an



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optimization of the desired luminosity of the application versus the manufacturing cost flexibility of the device.

Claims 28-32 are rejected for the same reasons as stated in the rejection of claim 27 above.

Regarding claims 33 and 34, Joannopoulos further discloses the use of extraction efficiencies above 95%. (Column 7 lines 12-17).

Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (US 2003/0141507) in view of Chen et al. (US 6,522,063).

Regarding claim 42, Krames discloses the device as claimed (see rejection of claim 27 above) but does not appear to specify the use of a current spreading layer between the first layer and a light generating region, however Chen, in the same field of endeavor, discloses the use of a current spreader between the ohmic contact and the light emitting layer. The current spreading layer advantageously distributes current more evenly on the chip. (Column 2 lines 1-5). This leads to a more even light emission and device longevity. Thus, it would have been obvious at the time the invention was made to a person having ordinary skills in the art to incorporate the current spreader taught by Chen into the device as disclosed by Krames in order to advantageously improve light emission and device lifespan.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Scherer et al. (US 6,534,798) discloses the use of surface features to improve extraction efficiency.

Shiang et al. (US 2004/0027062) discloses the use of surface features to improve extraction efficiency.

***Contact Information***

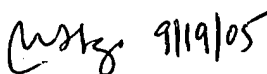
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matt P Hodges whose telephone number is (571) 272-2454. The examiner can normally be reached on 7:30 AM to 4:00 PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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**MARICELI SANTIAGO**  
**PRIMARY EXAMINER**